Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Monte Carlo and Langevin dynamics simulations for the steady-state and relaxation properties of magnetic flux lines in type-II superconductors[1] HIBA ASSI, ULRICH DOBRAMYSL, MICHEL PLEIMLING, UWE TAUBER, Department of Physics, VA Tech — We investigate the non-equilibrium relaxation properties and steady states of interacting magnetic flux lines in type-II superconductors in the presence of driving external currents and / or different types and configurations of pinning centers. We model the vortices as elastic lines, and study the competing effects of thermal fluctuations, mutual repulsion, and pinning to defects. We employ both three-dimensional Monte Carlo and more efficient Langevin molecular dynamics simulations. Comparison of the resulting data for the non-equilibrium stationary states as well as the preceding relaxation regimes allows us to validate the utilization of both algorithms in out-of-equilibrium settings. We furthermore carefully analyze finite-size effects.

[1]Research supported by the U.S. Department of Energy, Office of Basic Energy Sciences, Division of Materials Sciences and Engineering under Award DE-FG02-09ER46613.

Hiba Assi
Department of Physics, VA Tech

Date submitted: 18 Oct 2012 Electronic form version 1.4